Project Synopsis

On

AI-Powered Resume Analyzer

**Submitted to D Y Patil International University, Akurdi, Pune
in partial fulfilment of full-time degree**

Master's of Computer Applications

Submitted By:

Name: Manasvi Pawar

PRN:20240804053

Ms.Shraddha Jadhav

(Project Guide)

Dr. Swapnil Waghmare   **Dr. Maheshwari Biradar**

(Project Coordinator)   (HOD, BCA & MCA)

School of Computer Science, Engineering and Applications

D Y Patil International University, Akurdi,Pune, INDIA, 411044

[Session 2024-2025]

TABLE OF CONTENTS

1. INTRODUCTION

In today's fast-paced hiring industry, recruiters often receive hundreds of resumes for a single job posting, making manual shortlisting inefficient and time-consuming. Traditional resume screening methods are prone to human bias and inconsistencies, leading to the potential loss of qualified candidates. The AI-Powered Resume Analyzer is designed to automate and optimize the recruitment process by using Natural Language Processing (NLP) techniques. It leverages TF-IDF (Term Frequency-Inverse Document Frequency) and Cosine Similarity to compare resumes with job descriptions, ranking candidates based on relevance and keyword matching. This project focuses on a beginner-friendly implementation, ensuring that even those with basic knowledge of AI and NLP can build and understand the system. The model will extract key information from resumes, analyze their content, and provide a relevance score to help recruiters make faster and data-driven hiring decisions. With an easy-to-use web interface for resume uploads and result visualization, this project aims to create a simple yet effective solution for modern hiring challenges.

1.1. Background

Hiring the right candidate can be time-consuming and difficult, especially when recruiters have to go through hundreds of resumes for a single job. Manually reviewing resumes is slow, prone to errors, and sometimes biased, leading to good candidates being overlooked. With the rise of AI and automation, we can make this process faster, fairer, and more efficient. The AI-Powered Resume Analyzer helps automate resume screening by comparing resumes with job descriptions using TF-IDF (Term Frequency-Inverse Document Frequency) and cosine similarity. This allows the system to rank candidates based on how well their skills match the job requirements.

1.2. Objectives

- Automate the resume screening process by analyzing and ranking resumes based on their relevance to job descriptions.

- Extract key details such as skills, experience, education, and contact information from resumes for better evaluation.

- Utilize AI techniques like TF-IDF and cosine similarity to compare resumes with job descriptions and calculate relevance scores.

- Improve hiring efficiency by helping recruiters quickly identify the most suitable candidates, reducing manual effort and hiring time.

- Ensure fair and unbiased resume screening by focusing only on skills and qualifications, minimizing human bias in the recruitment process.

- Assist job seekers by allowing them to check how well their resume matches a specific job and providing insights for improvement.

- Develop an intuitive and user-friendly web interface where recruiters and job seekers can easily upload resumes and analyze results.

1.3. Purpose

The purpose of this project is to automate and streamline the resume screening process using AI and NLP techniques. By leveraging TF-IDF and cosine similarity, the system ensures fair, unbiased, and efficient candidate shortlisting based on skills and qualifications. It helps recruiters save time by reducing manual effort while also assisting job seekers in understanding how well their resume matches a job description. The goal is to create a user-friendly platform that enhances the recruitment process, making it faster, more accurate, and data-driven.

2.   GAP IDENTIFICATION

Traditional resume screening is a slow and manual process, leading to inefficiencies, delays, and human bias. Most hiring systems rely on basic keyword matching, which often fails to assess a candidate's true relevance.   Existing Applicant Tracking Systems (ATS) lack contextual understanding, making shortlisting inaccurate and inconsistent. Recruiters struggle to process large volumes of resumes efficiently, increasing the chances of overlooking qualified candidates. Job seekers also face challenges in understanding how well their resumes match job descriptions. The AI-Powered Resume Analyzer addresses these issues by using TF-IDF and cosine similarity to rank resumes based on relevance, ensuring a faster, fairer, and more precise hiring process.

3. METHODOLOGY

3.1. Methodology (Algorithms used)

The AI-Powered Resume Analyzer follows a structured approach to analyze resumes and match them with job descriptions using Natural Language Processing (NLP) and Machine Learning techniques. The key steps involved are:

1. **Resume Job Description Extraction:**

   - Extract text from PDF/DOCX resumes using pdfplumber and python-docx.
   - Convert job descriptions into structured text for comparison.

2. **Preprocessing Cleaning:**

   - Convert text to lowercase, remove special characters, stopwords, and punctuation.
   - Tokenize sentences using NLTK or spaCy for efficient text processing.

3. **Feature Extraction using TF-IDF:**

   - Apply TF-IDF (Term Frequency-Inverse Document Frequency) to convert resume text into numerical vectors.
   - This technique helps in identifying important keywords based on their significance in the document.

4. **Similarity Measurement using Cosine Similarity:**

   - Compute cosine similarity between the resume and job description vectors to measure relevance.
   - A higher similarity score indicates a better match for the job.

5. **Ranking Result Generation:**

   - Rank resumes based on similarity scores and display results in descending order.
   - Provide a matching percentage to help recruiters make informed decisions.

6. **User Interface Deployment (Future Enhancements):**

   - Develop a web-based UI using Flask/Django (Python) for uploading resumes and viewing results.
   - Deploy as a REST API to integrate with company HR systems or job portals.

Techniques Algorithms Used

5

- **TF-IDF (Term Frequency-Inverse Document Frequency)** – Extracts important words and gives weightage to terms based on frequency.

- **Cosine Similarity** – Measures the similarity between resumes and job descriptions by comparing their TF-IDF vectors.

- **Natural Language Processing (NLP)** – Used for text preprocessing, tokenization, and stopword removal.

- **Flask (Backend)** – For API development and processing resume queries.

- **pdfplumber python-docx** – To extract text from different resume file formats.

- **Frontend Development** - A simple web-based UI using HTML, CSS, and JavaScript to allow recruiters to upload resumes and view results.
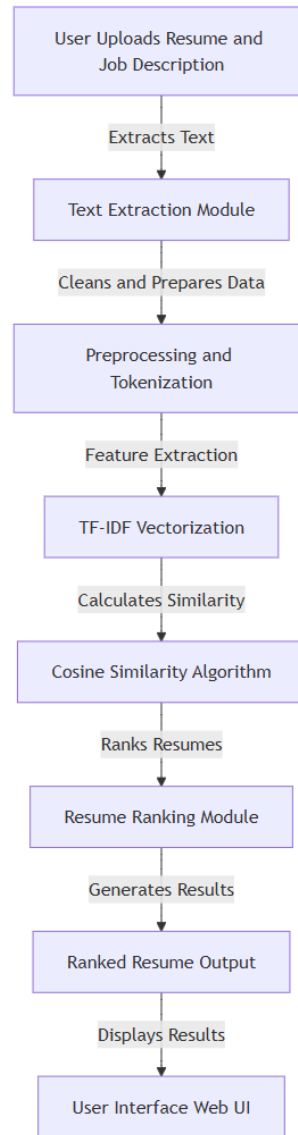
3.2. Block Diagram

Figure 3.1: Block Diagram
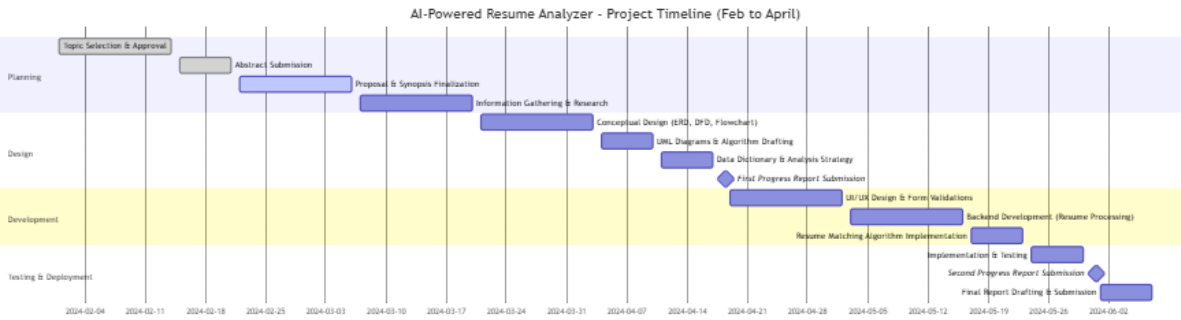
4. PROJECT FLOW DIAGRAMS

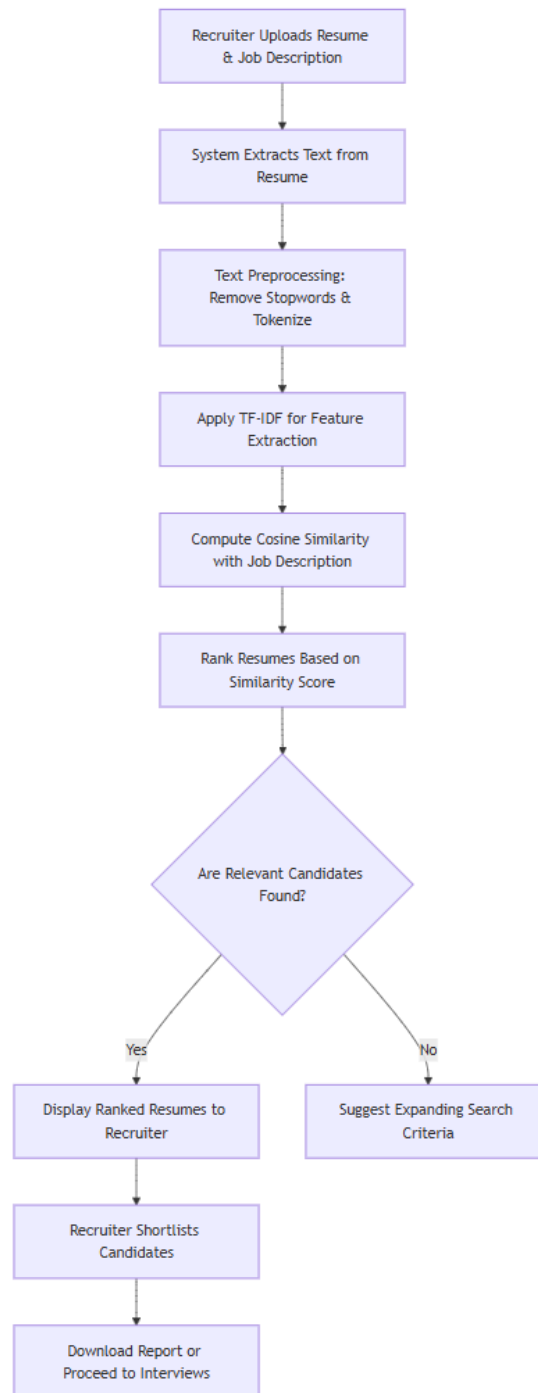## 4.1. Gantt Chart

Figure 4.1: Gantt Chart

4.2. Flowchart

Figure 4.2: Flowchart

References

- **h**ttps://ieeexplore.ieee.org/document/9689075

- **h**ttps://www.youtube.com/watch?v=hqu5EYMLCUw

- **h**ttps://www.youtube.com/watch?v=3WBWQ9hb9YU

- **h**ttps://github.com/jsvine/pdfplumber

- **h**ttps://www.coursera.org/articles/how-to-make-a-resume